Spraying Fruit Trees to a "T"

Field tests show the effectiveness of a new T-shaped sprayer developed by Michigan State University engineers to apply pesticides in orchards. The sprayer uses about 50 percent less chemical per acre and cuts application time in half. This is because it travels above the trees, moving up and down 5 to 17 feet above ground to accommodate tree height. It can spray two rows at once, sending low-volume, uniform droplets directly down into the trees.

The sprayer uses only about 25 gallons to cover an acre. Current air-blast equipment sprays about 50 gallons an acre, one row at a time, shooting straight into the air and giving uneven coverage. Growers are evaluating the new sprayer for use on grapes, blueberries, and stone fruits. *Charles C. Reilly, USDA-ARS Southeastern Fruit and Tree Nut Research Laboratory, Byron, Georgia; phone (912) 956-6409, e-mail creilly@byronresearch.net.*

Tackling Trouble on the Grapevine

ARS and Brazilian scientists have teamed up for a new investigation of the microbe that causes Pierce's disease in grapevines. The collaboration will reveal the makeup, or sequence, of all of the genes in the bacterium, *Xylella fastidiosa,* the organism responsible for this costly disease. In northern California, Pierce's disease has chronically attacked vineyards. More recently it has plagued southern California vineyards, as well.

A half-inch-long insect known as the glassy-winged sharpshooter can harbor *Xylella* in its gut, then move the pathogen into plants when it punctures grapevine stems to feed. Severely infected vines die.

Brazilian scientists have already sequenced the genome of a related *Xylella fastidiosa* strain that causes a disease known as citrus variegated chlorosis. In addition to ARS, sponsors of the new research venture are the American Vineyard Foundation, the California Department of Food and Agriculture, and Brazil's State of São Paulo Research Foundation. *Kevin J. Hackett, USDA-ARS National Program Staff, Beltsville, Maryland; phone (301) 504-4680, e-mail kjh@ars.usda.gov.*

JACK KELLY CLARK, COURTESY OF UC REGENTS

Glassy-winged sharpshooter. Shown about 3 times actual size.

CO_2 Could Aggravate Allergies

Another result of rising atmospheric CO_2 may be an increase in ragweed pollen. Researchers have made pollen counts on ragweed grown in indoor chambers at various levels of atmospheric CO_2. The gas levels ranged from the turn-of-the-century level of around 280 parts per million (ppm) to today's 370 ppm and the 600 ppm predicted by the year 2100. Pollen production went from 5.5 grams to 10 grams to 20 grams per plant as CO_2 moved through these three levels.

Experiments have since moved outside, with researchers checking on ragweed pollen production in urban, suburban, and rural areas around Baltimore, Maryland. The project is a collaborative effort of Johns Hopkins University School of Public Health, Towson University, and Multidata Corporation. *Lewis H. Ziska, USDA-ARS Climate Stress Laboratory, Beltsville, Maryland; phone (301) 504-6639, e-mail ziskal@ba.ars.usda.gov.*

Improving Aluminum Tolerance in Small Grains

The third most abundant element in the Earth's crust, aluminum is a major component of soil clay. It causes no problem in neutral or alkaline pH, but in acidic soils, it damages plant root systems and greatly reduces crop yields.

More than half of the world's 8 billion acres of potential agricultural land—including about 86 million U.S. acres—have an aluminum problem.

Researchers want to develop crop varieties with increased genetic resistance to aluminum. They've identified genetic markers for a single gene in barley that enhances aluminum tolerance. These markers may be used in plant breeding programs aimed at shuttling aluminum-tolerance genes from tolerant barley varieties to aluminum-sensitive ones.

Study results also suggest that aluminum tolerance in barley and in wheat, its close relative, may be owing to the action of different forms of the same gene. So it may be possible to engineer increased aluminum tolerance in barley by introducing a wheat gene for aluminum tolerance. *David R. Garvin, USDA-ARS U.S. Plant, Soil, and Nutrition Laboratory, Ithaca, New York; phone (607) 255-7308, e-mail dfg3@cornell.edu.*

Correction: The cover photo of the September 2000 issue shows orchids and anthuriums.